

## Some comments on the Prize problems

February 6, 2013

It is of course very risky to try to predict whether a problem is difficult or not. Nonetheless I will try to explain my feelings about these.

To me the most interesting of all these problems is the “Convexity” problem. It is possible that there exists a simple counterexample. As for a positive result, I have no idea about which direction one should even start to investigate.

The “Simple combinatorics” problem is a kind of special case of the convexity problem, a combinatorial version. I see no way to provide a positive solution to the Convexity problem without have first solved this one. Again, and this time despite considerable effort, I do not see how to even start (but of course, there might be a simple counterexample).

The matching problem, is possibly very difficult, but in the case  $\alpha_1 = \infty$ ,  $\alpha_2 = 2$  there is a natural approach. It involves controlling the size in  $L^2$  of a class functions of 2 variables which satisfy conditions on their partial derivatives (or, more accurately, a discrete version of this statement). So I am tempted to say that this problem is only a good technical argument away.

The convolution problem is cute and challenging. It may require one single good idea. It is in a sense the least interestion of these problems. I see no application whatsoever, but of course one never knows what one might invent while solving a new question.